

Metal Industry Indicators

Indicators of Domestic Primary Metals, Steel, Aluminum, and Copper Activity

May 2000

The primary metals leading index posted a strong gain in April, following declines in February and March. That increase makes the downturn in future U.S. primary metals activity signaled last month by the leading index now appear much less likely. However, the overall industry is likely to experience only flat-to-slow growth in the months ahead. The metals price leading index and the growth rate of U.S. inventories of metal products both point to weak growth for most metal prices in the near future.

The **primary metals leading index** gained 1.8% in April, moving to 129.0 from a revised 126.7 in March. Its 6-month smoothed growth rate, a compound annual rate that measures the near-term trend, advanced to 0.6% from a revised -2.6% in March. A growth rate below -1.0% usually signals a downward near-term trend for metals activity, while a growth rate above +1.0% usually signals an upward near-term trend.

Because only four of the index's eight components were available to compute the April index, it should be considered preliminary. Two index components, the S&P stock price index for diversified machinery companies and the length of the average workweek in primary metals establishments, posted unusually large increases and accounted for all of the net increase in the leading index. The other two available components, the metals price index growth rate and the Purchasing Managers' Index, moved down relatively small amounts. The growth rate of the leading index points to flat-to-slow growth in overall U.S. primary metals activity in the near future.

The **steel leading index** decreased 0.6% in March, the latest month for which it is available, slipping to 110.9 from a revised 111.6 in February. Its 6-month smoothed growth rate moved down to -2.1% from a revised -1.1% in February. The largest negative contribution to the net decline in the index came from the length of the average workweek in steel mills. In all, five index components decreased, while four increased. At -2.1%, the growth rate of the steel leading index is in the range that points to slower growth in domestic steel activity in the near future.

The **aluminum mill products leading index** rose 0.6% in March to 159.1 from a revised 158.1 in February, equaling the all-time high for this index reached last June. The index's 6-month smoothed growth rate advanced to 2.2% from a revised 1.4% in

February. Most of the March increase is attributable to one component, net new orders for aluminum mill products, which reached the third highest level on record. The growth rate of this leading index points to modest near-term growth in U.S. aluminum mill products activity.

The **primary aluminum leading index** dipped 0.3% in March to 91.5 from a revised 91.8 in February, and its 6-month smoothed growth rate declined to -0.4% from a revised 0.9% in February. Only two of the index's seven components increased in March, the ratio of shipments to inventories for motor vehicles and parts and the length of the average workweek in primary aluminum establishments. The largest negative contributors were the spot price for primary aluminum on the London Metal Exchange and the S&P stock price index for aluminum companies. The growth rate of the primary aluminum leading index was quite strong from April of last year through January, holding out some hope of modest near-term growth in the domestic primary aluminum industry. Much of the higher demand for primary aluminum anticipated by the leading index, however, was filled by imports. The trend of the leading index is pointing to weak growth in domestic activity. (Tables and charts for the primary aluminum indexes are in a separate file.)

The **copper leading index** edged up 0.2% in March—only its second increase in the past eight months—to 128.3 from a revised 128.1 in February. At the same time, the index's 6-month smoothed growth rate rose slightly, moving up to -3.6% from a revised -4.0% in February. Increases in two components, the ratio of shipments to inventories for electronic and other electrical equipment and the S&P stock price index for building materials companies, accounted for nearly all of the gain in the leading index. Despite its small increase in March, the perfor-

mance of the copper leading index over the past eight months suggests that further declines in domestic copper activity are likely over the next few months.

New Metals Price Leading Index Moves Down Again

The **metals price leading index** moved down 0.6% in March, the latest month for which it is available, slipping to 106.7 from a revised 107.4 in February. (A major revision to the metals price leading index is described in the April 2000 *Metal Industry Indicators*.) The index's 6-month smoothed growth rate slid to -3.4% from a revised -2.7% in February. Three of the index's four components were available for March, and all three decreased. A narrowing of the spread between the U.S. 10-year Treasury Note and the federal funds rate accounted for most of the decline in the metals price leading index. The growth rates of the index measuring the trade-weighted average exchange value of major currencies against the U.S. dollar and the inflation-adjusted value of new orders for U.S. nonferrous metals posted smaller declines. The fourth index component, the growth rate of

the 14-Country Long Range Gauge calculated by the Economic Cycle Research Institute, was available only through February, when it declined. This gauge is a leading index of future economic activity for 14 major industrialized countries.

The 6-month smoothed growth rate of the inflation-adjusted value of U.S. nonferrous metal products inventories increased to -2.8% in March from a revised -4.7% in February. (This indicator has an inverse relationship with metal prices. When the inventory growth rate increases, metal prices are more likely to decrease.)

The decrease in the metals price leading index, which measures the demand for metals, and the increase in the growth rate of metal inventories, which measures supply, both point to weaker growth in overall metals prices in the coming months. The business cycle and inventories are only two factors in metals price determination. Other factors that affect prices include changes in metals production, speculation, foreign exchange rates, strategic stockpiling, political instability, and production costs.

Table 1.
Leading Index of Metal Prices and Growth Rates of the Nonferrous Metals Price Index, Inventories of Nonferrous Metal Products, and Selected Metal Prices

	Leading Index of Metal Prices (1967=100)	Six-Month Smoothed Growth Rates				
		MII Nonferrous Metals Price Index	U.S. Nonferrous Metal Products Inventories (1982\$)	Primary Aluminum	Primary Copper	Steel Scrap
1999						
March	109.6r	-14.4	3.2	-12.6	-25.1	-29.8
April	108.5r	6.4	0.2	8.8	-1.7	-25.3
May	108.9r	-9.6	-2.7	-4.9	-21.7	-7.6
June	109.6r	12.2	-0.9	15.3	11.7	2.2
July	108.3r	13.5	-4.0	15.8	11.4	4.4
August	109.0r	25.6	-5.0	26.7	21.7	24.9
September	108.3r	27.9	-6.8	28.0	31.0	26.6
October	108.9r	23.8	-7.3	24.4	28.0	26.2
November	109.0r	26.6	-4.7r	29.4	26.5	42.7
December	108.2r	38.6	-4.5	42.7	38.3	55.8
2000						
January	109.2	40.1	-2.6	52.1	29.7	55.2
February	107.4r	13.7	-4.7r	20.6	7.6	22.7
March	106.7	7.8	-2.8	9.6	9.8	19.8
April	NA	0.4	NA	-1.7	4.9	15.7

NA: Not available r: Revised

Note: The components of the Leading Index of Metal Prices are the spread between the U.S. 10-year Treasury Note and the federal funds rate, and the 6-month smoothed growth rates of the deflated value of new orders for nonferrous metals, the Economic Cycle Research Institute's 14-Country Long Range Gauge, and the reciprocal of the trade-weighted average exchange value of the U.S. dollar against other major currencies. The Metal Industry Indicators (MII) Nonferrous Metals Price Index measures changes in end-of-the-month prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange (LME). The steel scrap price used is the price of No. 1 heavy melting. Inventories consist of the deflated value of finished goods, work in progress, and raw materials for U.S.-produced nonferrous metals and nonferrous metal products. Six-month smoothed growth rates are based on the ratio of the current month's index or price to its average over the preceding 12 months, expressed at a compound annual rate.

Sources: U.S. Geological Survey (USGS); American Metal Market (AMM); the London Metal Exchange (LME); the Bureau of the Census; the Economic Cycle Research Institute, Inc. (ECRI); and Federal Reserve Board.

**CHART 1.
LEADING INDEX OF METAL PRICES AND GROWTH RATES
OF NONFERROUS METALS PRICE INDEX, INVENTORIES OF
NONFERROUS METAL PRODUCTS, AND SELECTED PRICES**

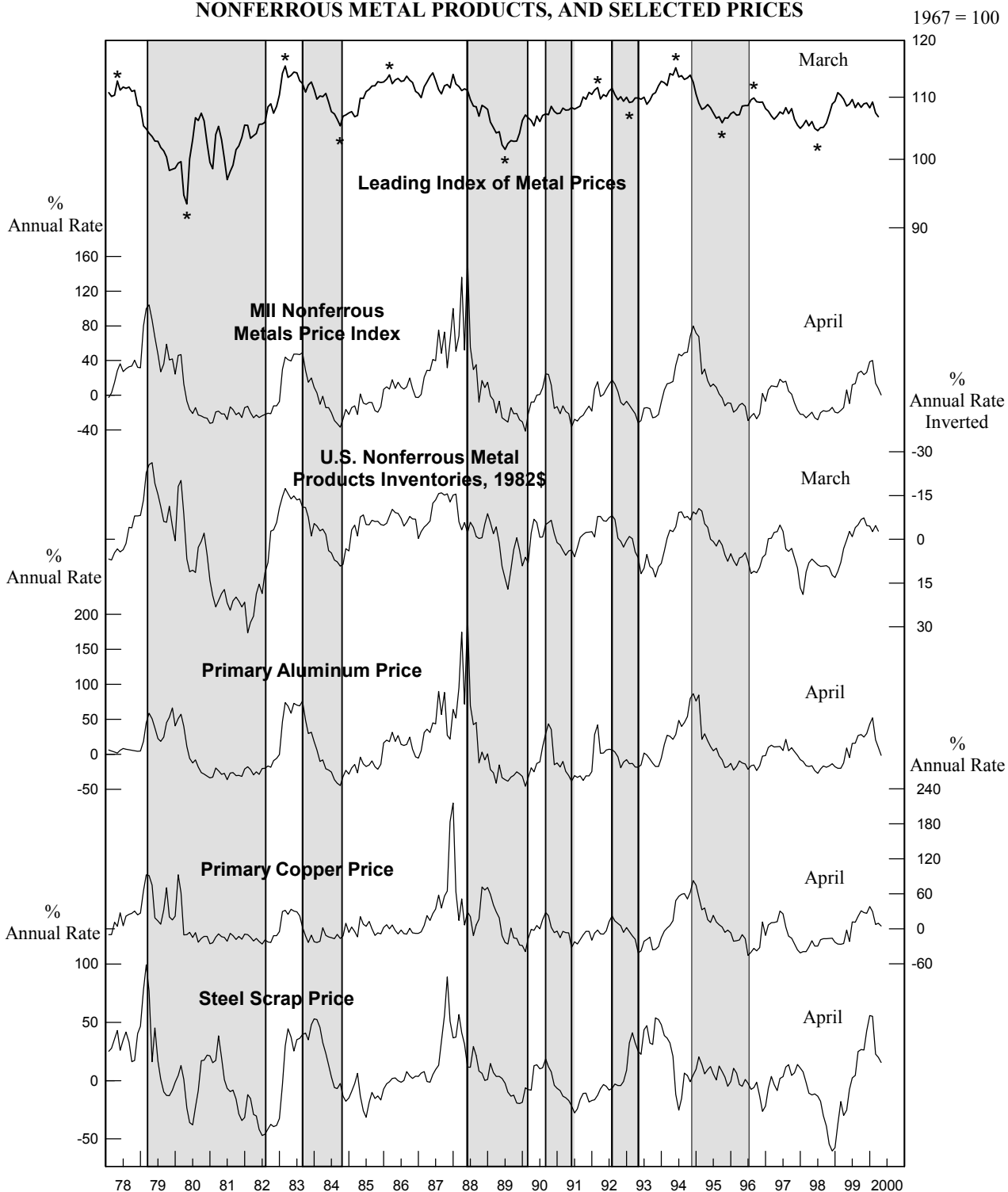


Table 2.
The Primary Metals Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1999				
May	128.7	3.9	111.5	1.2
June	129.5	4.9	112.2	2.3
July	129.3	4.3	113.1	3.8
August	129.4	4.1	113.4	3.8
September	128.5	2.2	113.2	3.2
October	128.4	1.6	112.8	2.3
November	128.7r	1.5	113.8	3.7r
December	128.8r	1.3	114.4	4.1r
2000				
January	130.2r	3.1r	114.8	4.2r
February	127.2	-1.8r	114.5r	3.0r
March	126.7r	-2.6r	114.9	3.1
April	129.0	0.6	NA	NA

NA: Not available r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 3.
The Contribution of Each Primary Metals Index Component to the Percent Change in the Index from the Previous Month

Leading Index	March	April
1. Average weekly hours, primary metals (SIC 33)	-0.1r	0.9
2. S&P stock price index, machinery, diversified	-0.1	1.3
3. Ratio of price to unit labor cost (SIC 33)	0.1	NA
4. Metals price index growth rate	-0.2r	-0.3
5. New orders, primary metals, (SIC 33) 1982\$	0.0	NA
6. Index of new private housing units authorized by permit	-0.1	NA
7. Growth rate of U.S. M2 money supply, 1996\$	0.1	NA
8. Purchasing Managers' Index	-0.1r	-0.2
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-0.4r	1.7
Coincident Index	February	March
1. Industrial production index, primary metals (SIC 33)	-0.2r	0.1
2. Total employee hours, primary metals (SIC 33)	0.1	0.1
3. Value of shipments, primary metals, (SIC 33) 1982\$	-0.3r	0.1
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.3r	0.4

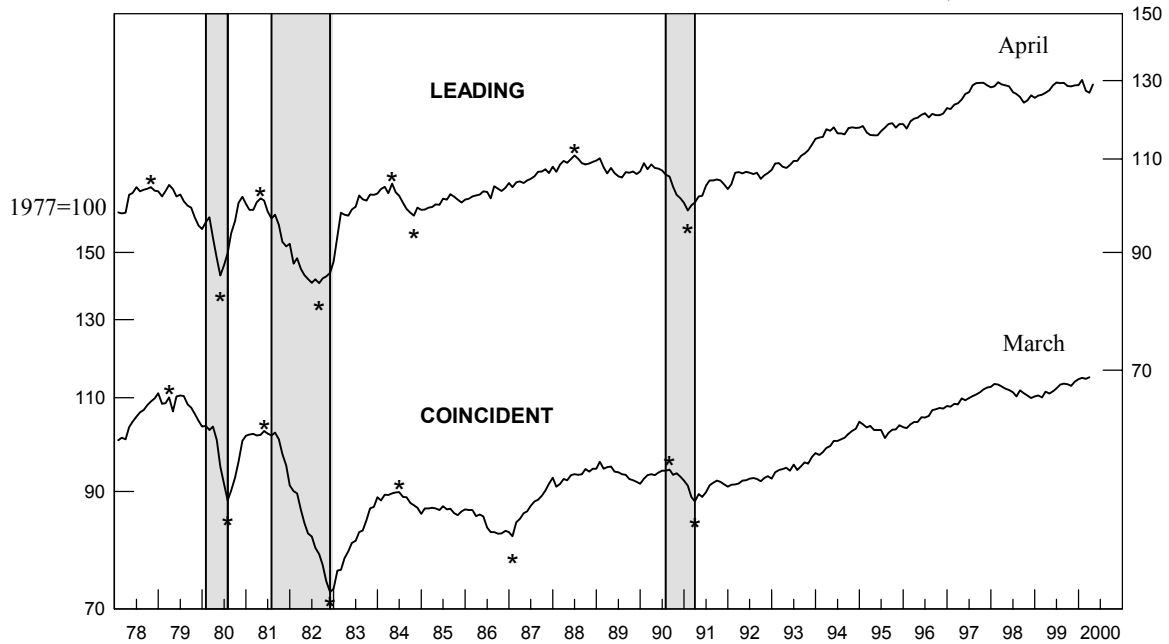
Sources: Leading: 1, Bureau of Labor Statistics; 2, Standard & Poor's; 3, U.S. Geological Survey; 4, Computed by the U.S. Geological Survey from individual monthly metals prices from the Journal of Commerce; 5, Bureau of the Census and U.S. Geological Survey; 6, Bureau of the Census and U.S. Geological Survey; 7, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 8, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey. All series are seasonally adjusted, except 2, 3, and 4 of the leading index.

NA: Not available r: Revised

Note: A component's contribution, shown in Tables 3, 5, 7, and 9, measures its effect, in percentage points, on the percent change in the index. Each month, the sum of the contributions plus the trend adjustment equals (except for rounding differences) the index's percent change from the previous month.

CHART 2.

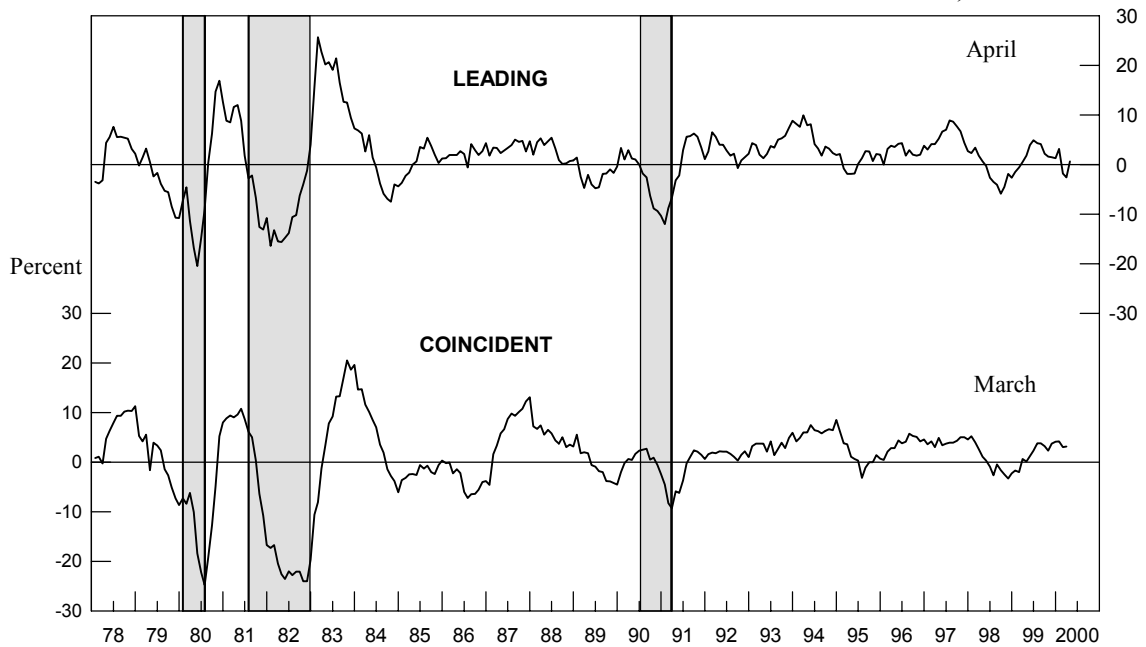
PRIMARY METALS: LEADING AND COINCIDENT INDEXES, 1978-2000 1977=100



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 3.

PRIMARY METALS: LEADING AND COINCIDENT GROWTH RATES, 1978-2000 Percent



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

Table 4.
The Steel Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1999				
April	111.5	3.6	98.6	0.6
May	112.5	5.3	99.2	1.8
June	113.0	5.9	99.6	2.8
July	112.8	5.1	100.3	4.1
August	113.1	4.8	101.1	5.5
September	111.1	0.8	101.0	4.9
October	111.6	1.1	101.1	4.6
November	112.6	2.2	102.2r	6.1r
December	112.7	2.0	102.3	5.5
2000				
January	113.8r	3.1r	102.4	4.8
February	111.6r	-1.1r	102.4r	3.9r
March	110.9	-2.1	102.8	3.8

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 5.
The Contribution of Each Steel Index Component to the Percent Change in the Index from the Previous Month

Leading Index	February	March
1. Average weekly hours, blast furnaces and basic steel products (SIC 331)	0.3	-0.4
2. New orders, steel works, blast furnaces, and rolling and finishing mills, 1982\$, (SIC 331)	-0.1	0.1
3. Shipments of household appliances, 1982\$	0.0	0.1
4. S&P stock price index, steel companies	-0.8	-0.1
5. Industrial production index for automotive products	-0.2r	0.1
6. Growth rate of the price of steel scrap (#1 heavy melting, \$/ton)	-0.5	-0.2
7. Index of new private housing units authorized by permit	-0.3	-0.1
8. Growth rate of U.S. M2 money supply, 1996\$	-0.4r	0.1
9. Purchasing Managers' Index	0.1	-0.1
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-1.9	-0.5
Coincident Index		
1. Industrial production index, basic steel and mill products (SIC 331)	-0.2r	0.1
2. Value of shipments, steel works, blast furnaces, and rolling and finishing mills (SIC 331), 1982\$	-0.1r	0.3
3. Total employee hours, blast furnaces and basic steel products (SIC 331)	0.1	-0.2
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.1	0.3

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Bureau of the Census and U.S. Geological Survey; 4, Standard & Poor's; 5, Federal Reserve Board; 6, Journal of Commerce and U.S. Geological Survey; 7, Bureau of the Census and U.S. Geological Survey; 8, Federal Reserve Board, Conference Board, and U.S. Geological Survey; and 9, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of the Census and U.S. Geological Survey; 3, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted, except 4 and 6 of the leading index.

r: Revised

CHART 4.
STEEL: LEADING AND COINCIDENT INDEXES, 1978-2000

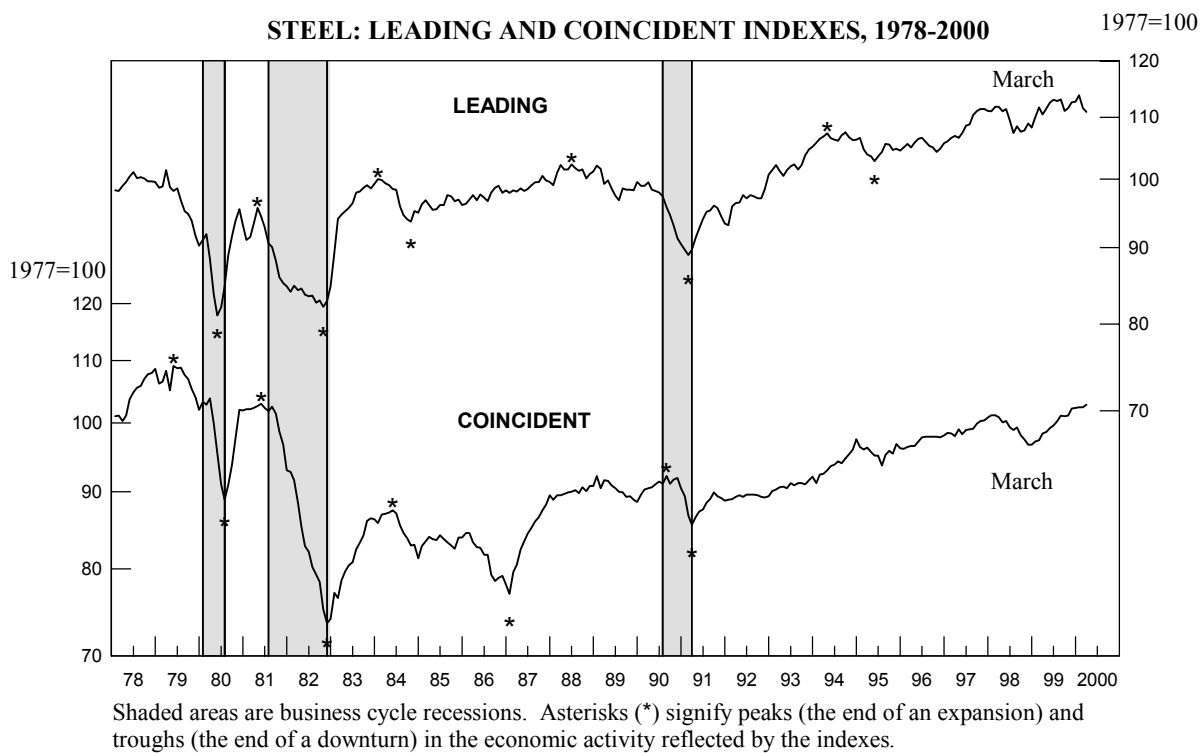


CHART 5.
STEEL: LEADING AND COINCIDENT GROWTH RATES, 1978-2000

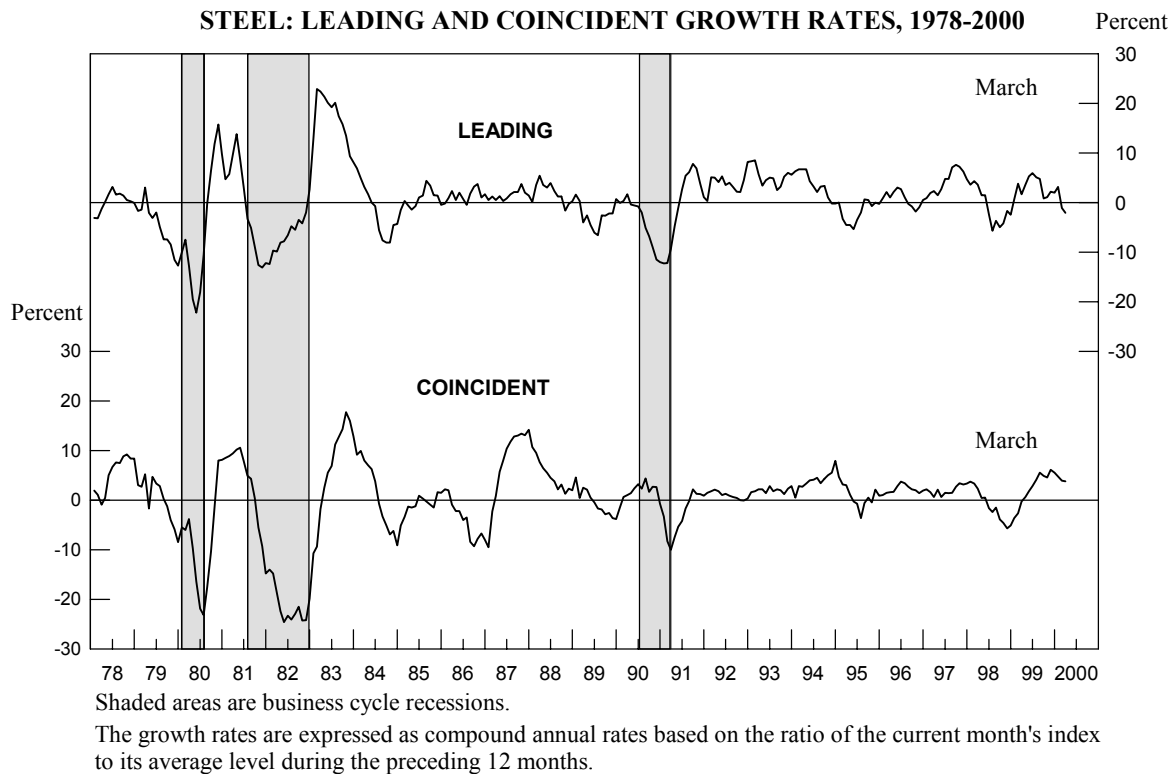


Table 6.
The Aluminum Mill Products Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1999				
April	156.1	2.7	140.7	0.5
May	157.6	4.3	141.4	1.5
June	159.1	5.5	142.3	2.6
July	158.8	4.3	141.6	1.5
August	157.9	2.4	143.7	4.5
September	157.3	1.5	142.7	3.0
October	155.1	-1.4	142.8	3.0
November	154.8	-1.7	141.3	0.6
December	156.6	0.2	143.2r	2.7r
2000				
January	159.0r	2.8r	143.5r	2.7r
February	158.1r	1.4r	143.5r	2.2
March	159.1	2.2	143.8	1.9

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

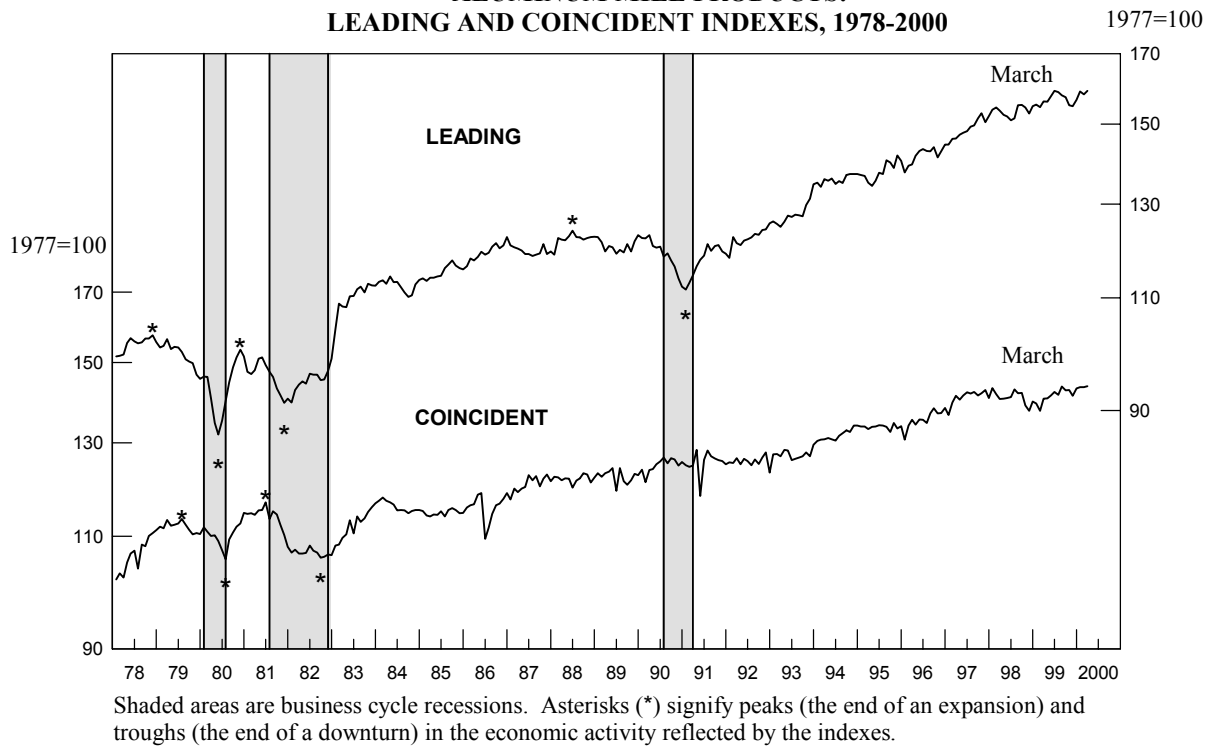
Table 7.
The Contribution of Each Aluminum Mill Products Index Component to the Percent Change in the Index from the Previous Month

Leading Index	February	March
1. Average weekly hours, aluminum sheet, plate, and foil (SIC 3353)	-0.2r	0.2
2. Index of new private housing units authorized by permit	-0.4	-0.2
3. Industrial production index for automotive products	-0.2	0.1
4. Construction contracts, commercial and industrial (square feet)	0.5	-0.1
5. Net new orders for aluminum mill products (pounds)	0.2	0.6
6. Growth rate of U.S. M2 money supply, 1996\$	-0.6	0.1
7. Purchasing Managers' Index	0.1	-0.2
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	-0.5	0.6
Coincident Index		
1. Industrial production index, aluminum sheet, plate, and foil (SIC 3353)	0.1r	-0.1
2. Total employee hours, aluminum sheet, plate, and foil (SIC 3353)	-0.3	0.1
Trend adjustment	0.2	0.2
Percent change (except for rounding differences)	0.0r	0.2

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Federal Reserve Board; 4, F.W. Dodge, Division of McGraw-Hill Information Systems Company; 5, The Aluminum Association, Inc. and U.S. Geological Survey; 6, Federal Reserve Board, Conference Board, and U.S. Geological Survey; 7, National Association of Purchasing Management. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics and U.S. Geological Survey. All series are seasonally adjusted.

r: Revised

**CHART 6.
ALUMINUM MILL PRODUCTS:
LEADING AND COINCIDENT INDEXES, 1978-2000**



**CHART 7.
ALUMINUM MILL PRODUCTS:
LEADING AND COINCIDENT GROWTH RATES, 1978-2000**

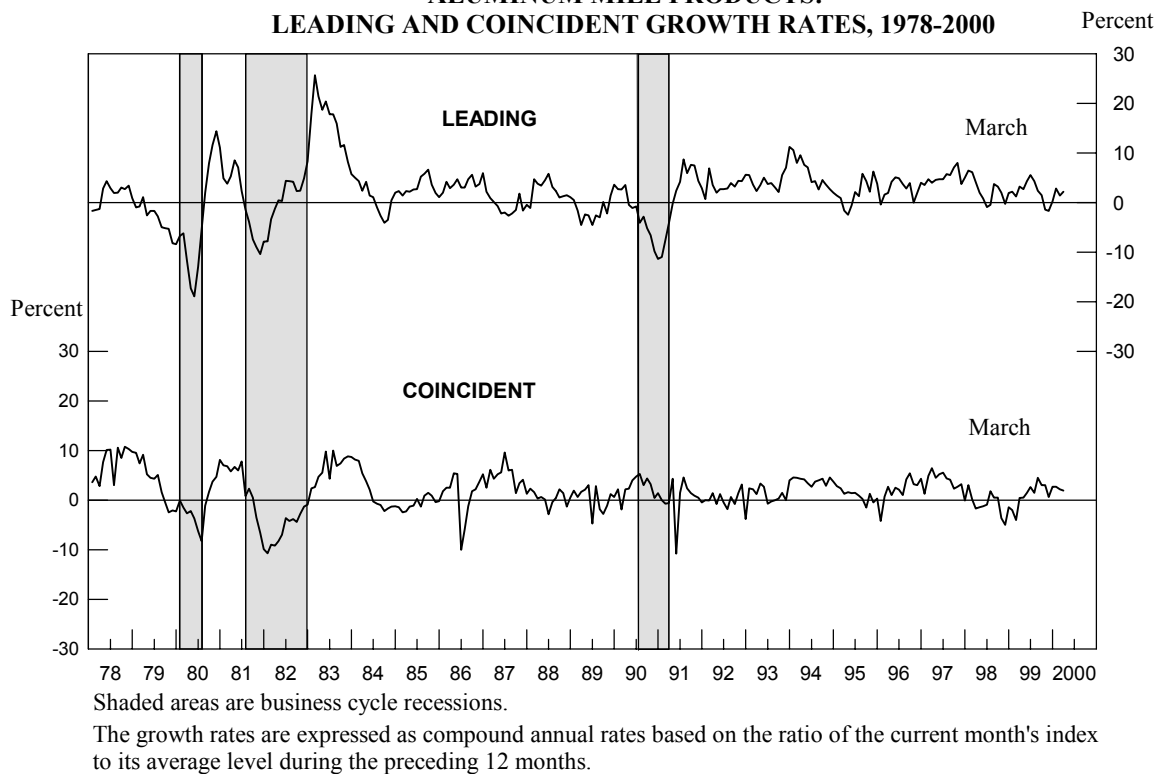


Table 8.
The Copper Industry Indexes and Growth Rates

	Leading Index		Coincident Index	
	(1977 = 100)	Growth Rate	(1977 = 100)	Growth Rate
1999				
April	130.3	2.6	124.8	-0.2
May	130.4	2.3	123.4	-2.4
June	132.4	4.9	122.8	-3.1
July	133.2	5.5	123.0	-2.6
August	132.7	4.2	122.8	-2.6
September	132.2	2.9	121.6	-4.0
October	131.2	0.9	122.1	-2.9
November	130.2	-1.0	121.6	-3.2
December	129.7	-1.8	121.8r	-2.4r
2000				
January	131.2	0.4	121.1	-3.0
February	128.1r	-4.0r	122.1r	-1.2r
March	128.3	-3.6	122.5	-0.3

r: Revised

Note: Growth rates are expressed as compound annual rates based on the ratio of the current month's index to the average index during the preceding 12 months.

Table 9.
The Contribution of Each Copper Index Component to the Percent Change in the Index from the Previous Month

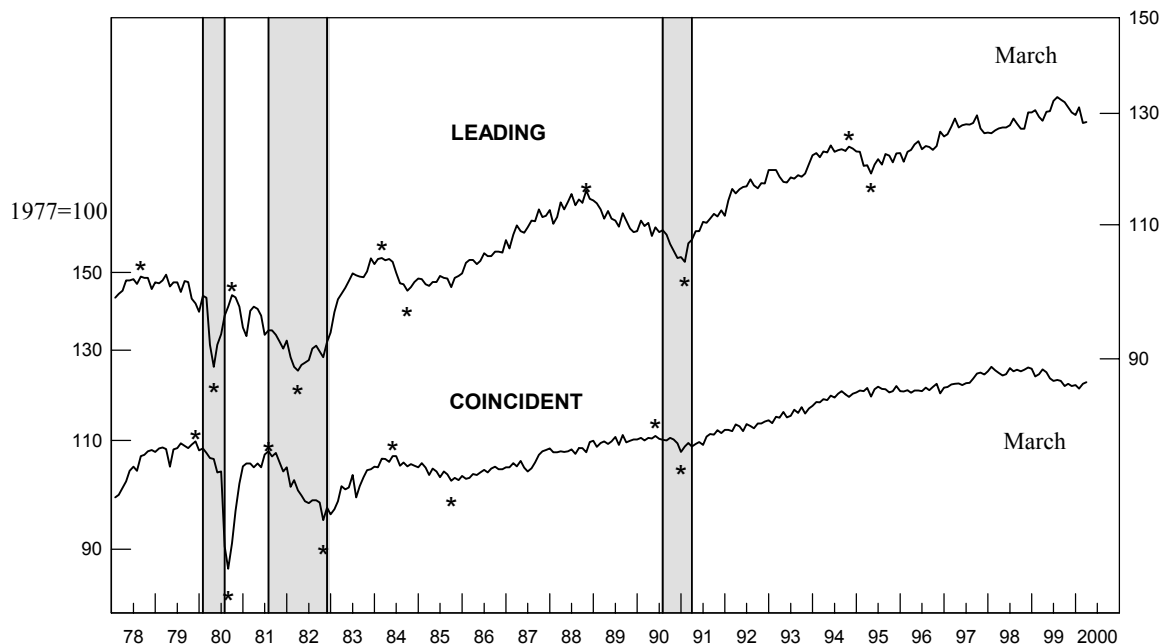
Leading Index	February	March
1. Average weekly overtime hours, rolling, drawing, and extruding of copper (SIC 3351)	0.3	-0.3
2. New orders, nonferrous and other primary metals, 1982\$	-0.1r	0.0
3. S&P stock price index, building materials companies	-1.3	0.4
4. Ratio of shipments to inventories, electronic and other electrical equipment (SIC 36)	-0.2r	0.5
5. LME spot price of primary copper	-0.4	0.1
6. Index of new private housing units authorized by permit	-0.4	-0.2
7. Spread between the U.S. 10-year Treasury Note and the federal funds rate	-0.3	-0.3
Trend adjustment	0.0	0.0
Percent change (except for rounding differences)	-2.4	0.2
Coincident Index		
1. Industrial production index, primary smelting and refining of copper (SIC 3331)	-0.6r	0.2
2. Total employee hours, rolling, drawing, and extruding of copper (SIC 3351)	0.7r	-0.1
3. Copper refiners' shipments (short tons)	0.6	0.1
Trend adjustment	0.1	0.1
Percent change (except for rounding differences)	0.8r	0.3

Sources: Leading: 1, Bureau of Labor Statistics; 2, Bureau of the Census and U.S. Geological Survey; 3, Standard & Poor's; 4, Bureau of the Census and U.S. Geological Survey; 5, London Metal Exchange; 6, Bureau of the Census and U.S. Geological Survey; 7, Federal Reserve Board and U.S. Geological Survey. Coincident: 1, Federal Reserve Board; 2, Bureau of Labor Statistics; 3, American Bureau of Metal Statistics, Inc. and U.S. Geological Survey. All series are seasonally adjusted, except 3, 5, and 7 of the leading index.

r: Revised

CHART 8.
COPPER: LEADING AND COINCIDENT INDEXES, 1978-2000

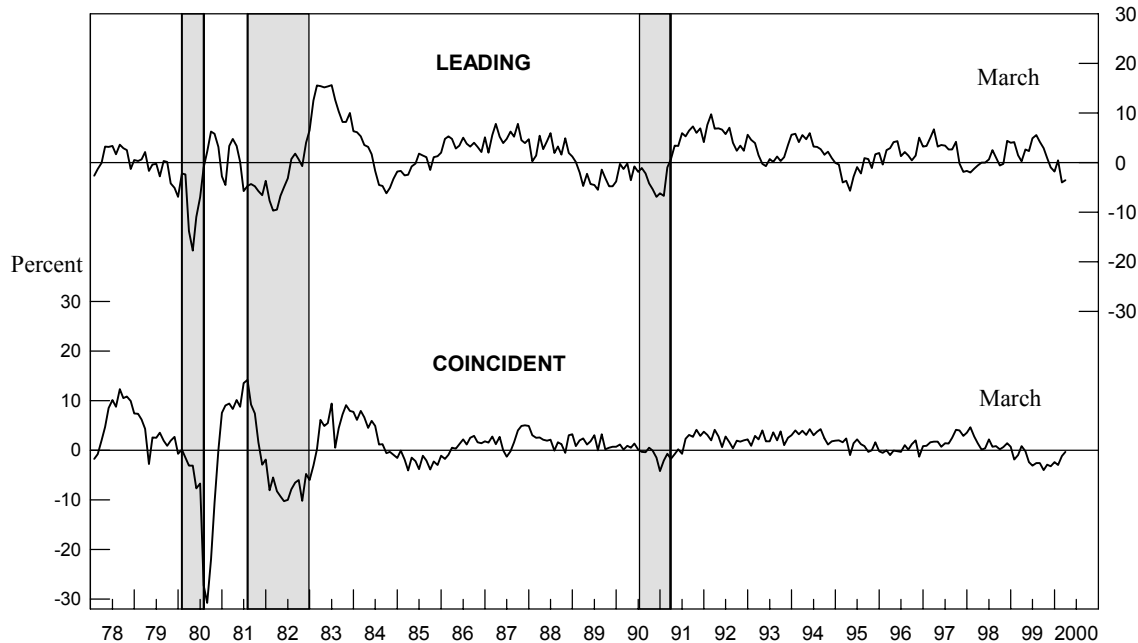
1977=100



Shaded areas are business cycle recessions. Asterisks (*) signify peaks (the end of an expansion) and troughs (the end of a downturn) in the economic activity reflected by the indexes.

CHART 9.
COPPER: LEADING AND COINCIDENT GROWTH RATES, 1978-2000

Percent



Shaded areas are business cycle recessions.

The growth rates are expressed as compound annual rates based on the ratio of the current month's index to its average level during the preceding 12 months.

Explanation

Each month, the U.S. Geological Survey tracks the effects of the business cycle on five U.S. metal industries by calculating and publishing composite indexes of leading and coincident indicators. Wesley Mitchell and Arthur Burns originated the cyclical-indicators approach for the economy as a whole at the National Bureau of Economic Research in the mid-1930's. Over subsequent decades this approach was developed and refined, mostly at the National Bureau, under the leadership of Geoffrey H. Moore.¹

A business cycle can briefly be described as growth in the level of economic activity followed by a decline succeeded by further growth. These alternating periods of growth and decline do not occur at regular intervals. Composite indexes, however, can help determine when highs and lows in the cycle might occur. A composite index combines cyclical indicators of diverse economic activity into one index, giving decision makers and economists a single measure of how changes in the business cycle are affecting economic activity.

The indicators in the metal industry leading indexes historically give signals several months in advance of major changes in a coincident index, a measure of current metal industry activity. Indicators that make up the leading indexes are, for the most part, measures of anticipations or new commitments to various economic activities that can affect the metal industries in the months ahead.

Composite coincident indexes for the metal industries consist of indicators for production, shipments, and total employee hours worked. As such, the coincident indexes can be regarded as measures of the economic health of the metal industries.

Four of the metal industry coincident indexes, those for primary metals, steel, primary aluminum, and aluminum mill products, reflect their classifications in the U.S. Standard Industrial Classification (SIC). The SIC is the main classification used by the United States government and industry in collecting and tabulating economic statistics. The coincident index for copper is a blend of two different copper industries, primary smelting and refining of copper and rolling, drawing, and extruding of copper.

Of the five metal industries, primary metals is the broadest, consisting of twenty-six different metal processing industries. The steel, aluminum, and copper industries are parts of the primary metals industry.

The metal industry leading indexes turn before their respective coincident indexes an average of 9 months for primary metals and 8 months for steel and copper. The average lead time for the primary aluminum leading index is 6 to 8 months, and the average lead time for the aluminum mill products leading index is 6 months.

¹Business Cycle Indicators, A monthly report from The Conference Board (March 1996).

The leading index of metal prices, also published in the *Metal Industry Indicators*, is designed to signal changes in a composite index of prices for primary aluminum, copper, lead, and zinc traded on the London Metal Exchange. On average, this leading index indicates significant changes in price growth about 8 months in advance.

The growth rate used in the *Metal Industry Indicators* is a 6-month smoothed growth rate at a compound annual rate, calculated from a moving average. Moving averages smooth fluctuations in data over time so that trends can be observed. The 6-month smoothed growth rate is based upon the ratio of the latest monthly value to the preceding 12-month moving average.

$$\left[\left(\frac{\text{current value}}{\text{preceding 12-month moving average}} \right)^{\frac{12}{6.5}} - 1.0 \right] * 100$$

Because the interval between midpoints of the current month and the preceding 12 months is 6.5 months, the ratio is raised to the 12/6.5 power to derive a compound annual rate.

The growth rates measure the near-term industry trends. They, along with other information about the metal industries and the world economy, are the main tools used to determine the outlook of the industries. A 6-month smoothed growth rate above +1.0% usually means increasing growth; a rate below -1.0% usually means declining growth.

The next summary is scheduled for release on MINES FaxBack at 10:00 a.m. EDT, Friday, June 16. Access MINES FaxBack from a touch-tone telephone attached to a fax machine by dialing 703-648-4999. The address for *Metal Industry Indicators* on the World Wide Web is: <http://minerals.usgs.gov/minerals/pubs/mii/>

The *Metal Industry Indicators* is produced at the U.S. Geological Survey by the Minerals Information Team. The report is prepared by Kenneth Beckman (703-648-4916), e-mail (kbeckman@usgs.gov), and Gail James (703-648-4915), e-mail (gjames@usgs.gov). The former Center for International Business Cycle Research, under the direction of Dr. Geoffrey H. Moore, and the former U.S. Bureau of Mines developed the metal industry leading and coincident indexes in the early 1990's. Customers can send mail concerning the *Metal Industry Indicators* to the following address:

U.S. Geological Survey
Minerals Information Team
988 National Center
Reston, Virginia 20192